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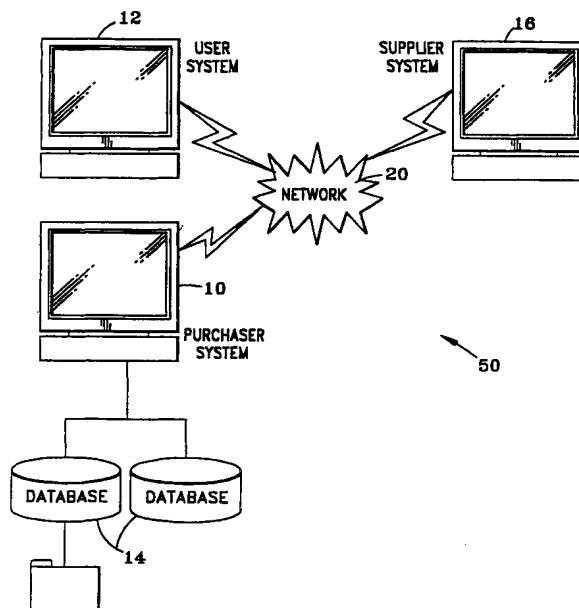
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(54) Title: METHOD AND SYSTEM FOR SPECIFYING MATERIALS



(57) **Abstract:** A method and system of facilitating the manufacture and purchase processes of materials whereby a first party defines a fingerprint of a desired material and then communicates that fingerprint, as well as the techniques of analysis used, to at least one second party. The second party then defines a second fingerprint of a second material using the same testing techniques and communicates the results to the first party for comparison of the two fingerprints. If the fingerprints do not match, the first party sends a notification of rejection to the second party. If the fingerprints are found to be a match, a purchase order or request for manufacture is initiated by the first party and the process is tracked from the date of order through the delivery of the material.



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*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

## METHOD AND SYSTEM FOR SPECIFYING MATERIALS

### BACKGROUND OF THE INVENTION

The invention relates to a method and system for specifying materials and in particular to a method and system for facilitating comparison of material fingerprints. In a chemical manufacturing environment, the quality of any manufactured product is dependent upon the quality of the raw materials used. In making any chemical or polymer based material, this is also the case. Currently, suppliers of raw materials typically provide a certificate of analysis along with the shipment of raw materials, which certifies that they meet the specifications agreed to between the supplier and the purchaser. However, these specifications are usually based on a few known key variables (e.g., specific components of the material, particle size, etc.). Also, the specifications do not usually cover every chemical issue that could occur or cause a raw material to be out of specification. As a result, these certificates of analysis cannot truly represent the quality of the material, but may include the potential for a great deal of subjectivity. It would be advantageous to facilitate the existing raw material specification process by providing a method and system for generating material fingerprints, comparing material fingerprints and facilitating communication of the results of the comparison to multiple parties.

### BRIEF SUMMARY OF THE INVENTION

An exemplary embodiment of the invention is a method of facilitating the purchase of materials. The method includes defining a first fingerprint of a first material by a first party. The first fingerprint is communicated to at least one second party. A second fingerprint of a second material is defined by the second party and provided to the first party. The first fingerprint is compared to the second fingerprint. Based upon results of the comparing, an approval or a rejection notice is communicated from the first party to the second party.

## BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a block diagram of an exemplary computer environment in which an embodiment of the invention may be implemented; and,

FIG. 2 is a flow chart of an exemplary raw material quality control process.

## DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

5 In accordance with one embodiment of the present invention, a materials specification and analysis system will typically be implemented on a system that includes one or more servers and one or more user systems coupled to a network. A portion of an exemplary system 50 on which the invention might be used is shown in FIG. 1. A server 10 at a purchaser's site  
10 is shown, coupled by a network 20 to one or more user systems 12. The network 20 may be any type of network including a local area network, wide area network, intranet, internet, etc. The user system 12 may be a general purpose computer executing a computer program for performing the processes described herein. The purchaser server 10 may be a server such  
15 as those known in the art which executes a computer program for performing the processes described herein. Programs executed by server 10 and data accessed by server 10 may be stored in one or more databases 14.

A user can control the user system 12 and provide input of commands and data via a keyboard (not shown) and/or mouse (not shown) or any other  
20 suitable input device. The user system 12 can access the server 10 through network 20 or the user system 12 can be coupled to the server 10 through a different network (e.g., intranet). Data can be accessed, manipulated, delivered or retrieved by the user system 12 through the server 10. Data can be delivered or uploaded to a purchaser's web site that is implemented by the  
25 purchaser's server 10 via a user system 12. The purchaser's web site can be accessed by a supplier system 16 where the data stored on said purchaser

web site can be accessed by the supplier system 16 and where the supplier system 16 can upload data onto the purchaser's web site. The supplier system 16 may be a general purpose computer executing a computer program for performing the processes described herein.

5           FIG. 2 represents an overview of a raw material quality control process in one embodiment of the present invention. The process shown in FIG. 2 is directed to analysis of a raw material for use in a manufacturing process. The invention is not limited to such an example and any material may be analyzed regardless of the application. In general, the purchaser provides a fingerprint  
10 of a desired raw material and the test methods used to generate the fingerprint to a supplier. The supplier uses this information to provide a suitable material to the purchaser.

          The desired fingerprint of a raw material may be defined by various methods. For example, at step 104, a series of specified analytical tests are  
15 performed on the purchaser's existing raw material. Examples of analytical tests are gas chromatography, infrared spectroscopy, particle size, and inductively coupled plasma (ICP) techniques which are used to determine the fingerprint for materials such as thermal stabilizers, dyes, process modifiers, mold releases, antioxidants and polymers. As used herein, fingerprint is  
20 intended to have a broad meaning and refers generally to data describing one or more characteristics of the material. The fingerprint is defined by the chemical composition and may be determined by performing a series of analytical tests. One example of a fingerprint is a plurality of data sets each generated by an analytical test. A plurality of testing techniques are preferred  
25 in defining a fingerprint because, in combination, they produce a more accurate composite of the raw material than would a single specified test.

          Once the testing is complete, a fingerprint of the raw material is generated at step 106. Regardless of the source, the fingerprint and the testing methods used to generate the fingerprint are saved and stored

electronically on the server 10 or database 14 at step 108. The fingerprint and testing methods may be either distributed by the server 10 to one or more supplier systems 16, or the fingerprint and testing methods may be retrieved by one or more supplier systems 16 with access permission to the purchaser's server 10. If the purchaser chooses to deliver the fingerprint and testing methods to one or more suppliers, a list of suppliers' addresses (e.g., e-mail addresses) is retrieved from the purchaser's database 14 at step 110 whereby the fingerprint and testing methods can be automatically distributed (e.g., via e-mail) to each supplier system 10 at step 112. Alternatively, the purchaser may choose to manually select through user system 12 which suppliers are to receive the fingerprint and testing methods at step 114. The purchaser may opt for a more passive approach by simply posting the stored fingerprint and testing methods on the purchaser's web site and allowing supplier systems 16 with access permission to contact server 10 through the purchaser's web site at step 116 and download the fingerprint and testing methods at step 118.

Once the purchaser's fingerprint and testing methods are received by the supplier at step 118, the supplier obtains raw materials that it believes to be the same or similar to those desired by the purchaser and performs testing methods on these raw materials at step 120 using the same analytical tests that were specified by the purchaser. The result of the supplier's tests (i.e., supplier fingerprint) is then uploaded onto the purchaser's web site at step 122 whereby a comparison is initiated between the purchaser fingerprint and supplier fingerprint using, for example, appropriate chemometrics-based analysis at step 124. The server 10 may perform the comparison or another computer may access the fingerprints from server 10 and perform the comparison. The comparison is performed in order to calculate the variations or disparities between the two fingerprints. Multivariate analysis is the preferred approach but least squares fit, factor analysis, and other approaches may also be used. The advantage of chemometrics is that the entire data set (or a predetermined subset of the entire data set) is taken from

multiple pieces of analytical data (e.g., factor analysis using infrared spectroscopy, gas chromatography, ICP, etc.) which increases the sensitivity and defines a material better than a simple visual or minimal data comparison (e.g., peak area differences in chromatographs).

5           The results of the comparison are distributed via the network 20 to the user system 12 and the supplier system 16 at step 126. At step 128 the results of the comparison are evaluated by using a predetermined set of criteria defined by the purchaser to decide whether the two fingerprints are close enough to be considered an acceptable match. The evaluation of the results may be performed automatically by the purchaser server 10 based on predefined criteria or an individual can evaluate the result of the comparison if objective evaluation is not possible by server 10. If a match is indicated at step 128, the supplier fingerprint and optionally the supplier name are stored in an approval list database which contains all approved fingerprints received from suppliers.

10           At step 130, the purchaser may assign a certification number to the fingerprint and provide the certification number to the supplier. The supplier can then reference the certification number when shipping product to the purchaser. In addition, purchase of the material may be initiated at step 130 with the purchaser manually conducting negotiations with the supplier or requesting additional information regarding the potential purchase of the material. Alternatively, the approved list may automatically trigger a purchase order to be sent to the supplier from the purchaser (e.g., e-mail from server 10 to supplier system 16) requesting manufacture and delivery of the specified material. This use of a certification number and/or a purchase order number allows for automated tracking of delivery, acceptance and any potential future issues regarding the material. Conversely, if the comparison of the purchaser fingerprint and supplier fingerprint results in a failure to match, then a notice of rejection is sent at step 132 by the purchaser to the supplier (e.g., e-mail from

server 10 to supplier system 16) declining to purchase the supplier's specified material.

As described above, the invention can be embodied in the form of computer-implemented processes and apparatuses for practicing those processes. The invention can also be embodied in the form of computer program code containing instructions embodied in tangible media, such as floppy diskettes, CD-ROMs, hard drives, or any other computer-readable storage medium, wherein, when the computer program code is loaded into and executed by a computer, the computer becomes an apparatus for practicing the invention. The invention can also be embodied in the form of computer program code, for example, whether stored in a storage medium, loaded into and/or executed by a computer, or transmitted over some transmission medium, such as over electrical wiring or cabling, through fiber optics, or via electromagnetic radiation, wherein, when the computer program code is loaded into and executed by a computer, the computer becomes an apparatus for practicing the invention. When implemented on a general-purpose microprocessor, the computer program code segments configure the microprocessor to create specific logic circuits.

While the invention has been described with reference to exemplary embodiments, it will be understood by those skilled in the art that various changes may be made and equivalents may be substituted for elements thereof without departing from the scope of the invention. In addition, many modifications may be made to adapt a particular situation or material to the teachings of the invention without departing from the essential scope thereof. Therefore, it is intended that the invention not be limited to the particular embodiments disclosed for carrying out this invention, but that the invention will include all embodiments falling within the scope of the appended claims.



## WHAT IS CLAIMED IS:

1. A method of facilitating the purchase of materials using a system including a purchaser server and a supplier system coupled over a network, the method comprising:

defining a first fingerprint of a first material by a first party;

communicating said first fingerprint to a second party;

defining a second fingerprint of a second material by said second party;

comparing said first fingerprint to said second fingerprint;

based upon results of said comparing, communicating one of an approval and a rejection from said first party to said second party.

2. The method of claim 1 wherein:

said first fingerprint is defined by performing a testing techniques on said first material by said first party.

3. The method of claim 2 further comprising:

communicating said testing technique to said second party.

4. The method of claim 3 wherein:

said second party defines said second fingerprint using said testing technique.

5. The method of claim 1 wherein:

said comparing of said first fingerprint to said second fingerprint includes chemometrics analysis.

6. The method of claim 1 wherein:

said results of said comparing are automatically distributed to said first party and said second party.

7. The method of claim 1 further comprising:

evaluating said results of said comparing by said first party.

8. The method of claim 7 wherein:

said evaluating is performed manually.

9. The method of claim 7 wherein:

said evaluating is performed automatically.

10. The method of claim 1 wherein:

one of said approval and rejection notices is automatically communicated to said second party by said first party.

11. A storage medium encoded with machine-readable computer program code for facilitating a material specification process, the storage medium including instructions for causing a server coupled to a user system and a supplier system by a network to implement a method comprising:

receiving a first fingerprint of a first material from the user system;

communicating said first fingerprint to the supplier system;

receiving a second fingerprint of a second material from said supplier system;

comparing said first fingerprint to said second fingerprint;

based upon results of said comparing, communicating one of an approval and a rejection notice over the network to the supplier system.

12. The storage medium of claim 11 wherein:

said first fingerprint is automatically communicated to said supplier system.

13. The storage medium of claim 11 wherein:

said first fingerprint is communicated to said supplier system by manual selection.

14. The storage medium of claim 11 wherein:

said first fingerprint is communicated said supplier system upon a request from the supplier system to the server.

15. The storage medium of claim 11 wherein:

results of said comparing are automatically communicated to said user system and said supplier system.

16. The storage medium of claim 11 further comprising instructions for causing the server to implement:

evaluating results of said comparing.

17. A system of facilitating the purchase of materials, the system comprising:

a purchaser server for receiving a first fingerprint of a first material defined by a first party;

a supplier system coupled to the purchaser server by a network, said purchaser server communicating said first fingerprint to said supplier system;

said supplier system transmitting a second fingerprint of a second material defined by a second party to said purchaser server;

said purchaser server comparing said first fingerprint to said second fingerprint and communicating one of an approval and a rejection from said purchaser server to said supplier system in response to results of the comparing.

18. The system of claim 17 wherein:

said first fingerprint is defined by performing a testing technique on said first material by said first party.

19. The system of claim 18 further comprising:

said purchaser server communicating said testing technique to said supplier system.

20. The system of claim 19 wherein:

said second party defines said second fingerprint using said testing technique.

21. The system of claim 17 wherein:

said comparing of said first fingerprint to said second fingerprint includes chemometrics analysis.

22. The system of claim 17 wherein:

said purchase server evaluates the results of said comparing said first fingerprint to said second fingerprint.

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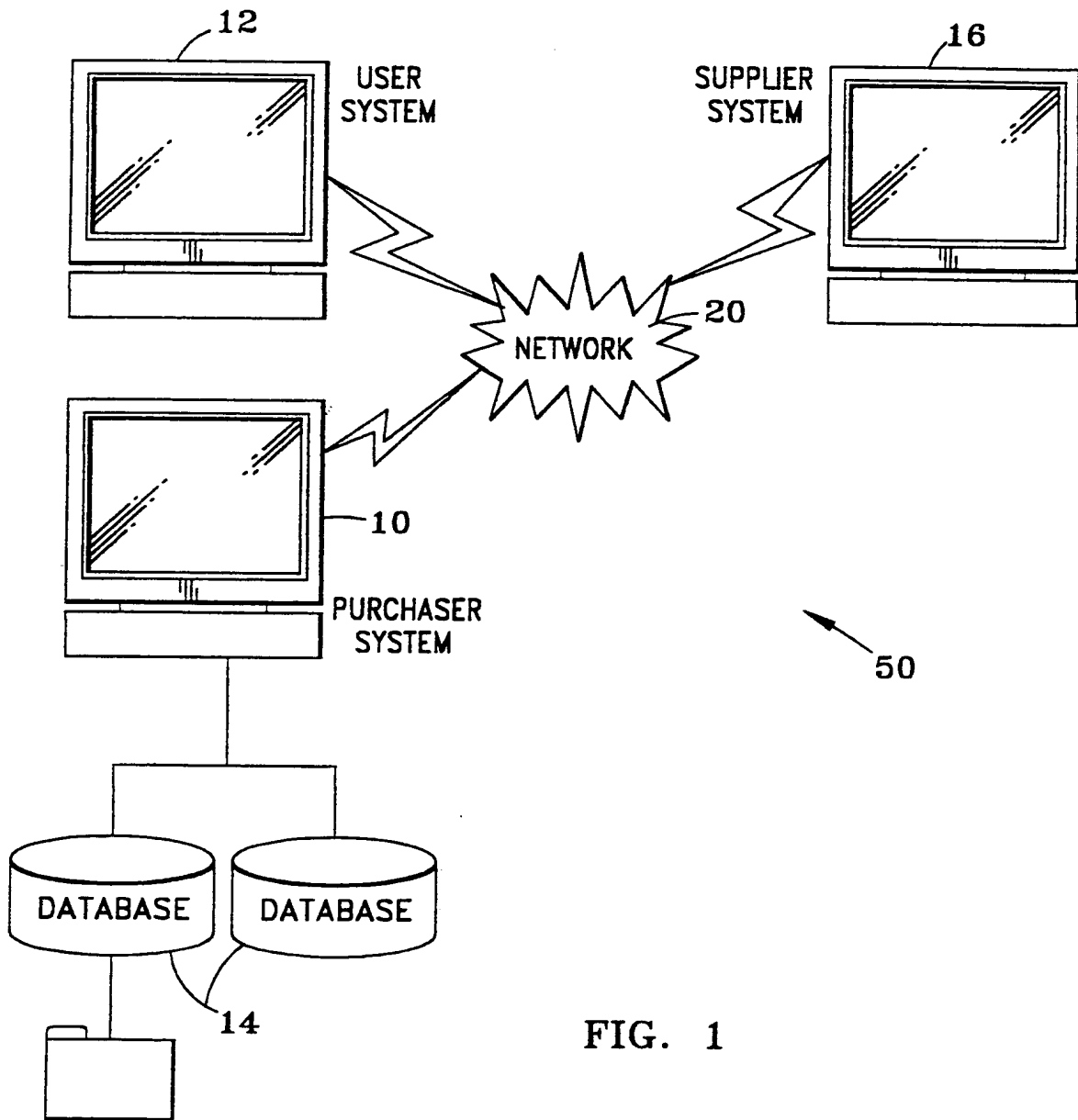


FIG. 1

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FIG. 2

